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COMPARATIVE STUDY ON RESOURCE USE EFFICIENCY AND ECONOMIC RETURNS OF BANANA FARMERS IN VARIOUS AGRO-CLIMATIC ZONES OF TAMIL NADU

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ABSTRACT
This paper attempts to estimate the cost and returns of banana cultivation in agro-climatic zones of Tamil Nadu, one of the major banana producers in India. The results of the study showed that in all the agro-climatic zones, labour occupied the major share in the total value of inputs followed by fertilizers and manure. The maximum net return in banana cultivation was from Western zone followed by High rainfall zone. The study suggested for recommended application of fertilizers to reduce the cost of production and price regulation for achieving maximum returns in banana farming.

KEY WORDS: Cost of cultivation, input value, yield and returns.

INTRODUCTION

Banana is one of the most important commercial fruits of the tropical world. The actual place where it had originated cannot be precisely circumscribed but generally agreed that all the edible bananas and plantains are indigenous to the warm, moist region of tropical Asia, probably in the mountainous regions where Assam, Myanmar, Thailand and Indo-China meet (Singh 1990). Banana is the second major fruit crop in India grown in an area of about 83 lakh hectares with an annual production of 46.26 lakh tonnes. India produces 30 % of the world's production, but exports is negligible at less than 1 %. The top export destinations of Indian banana are Qatar, Saudi Arabia, Oman, United Arab Emirates and Kuwait. The important banana growing states are Maharashtra, Tamil Nadu, Andhra Pradesh, Kerala, Karnataka, West Bengal, Bihar and Gujarat. It is estimated that the present annual per capita consumption of banana in India is 50 kg per head which is very low compared with other progressive banana growing countries such as Jamaica, Congo, Equator, Kenya and Uganda. Thus there is an immense scope of increasing banana production in the country. Banana yield in Tamil Nadu is much higher than the national average with 100 metric tonnes produced per hectare against the national average of 37 metric tonnes. The major varieties grown in the state are Poovan, Rasthali, G9, Karpuravalli, Kathali, Robusta, Nendran, Monthan, Red banana and Nadan. It is the general view that of all the horticultural crops, banana farming is highly remunerative to farmers. Hence the study is conducted to estimate the cost and the economic returns from the crop in major agro- climatic zones of Tamil Nadu.

METHODOLOGY

In order to study the resource use, cost and returns of banana cultivation in each agro climatic zone of Tamil Nadu, one district in each agro- climatic zone of Tamil Nadu wherein the highest area under banana was selected. Then in each selected district, four blocks where the area under banana was highest was selected. In each selected block ten farmers were chosen. Thus the total sample size in all the selected zones comes to 160. The major banana growing district in each agro -climatic zone is given in Table 1. The primary data with respect to cost of cultivation for banana was collected during 2014-15. Cost and returns were estimated based on the cost principle adopted by the Commission for Agricultural Costs and Prices (CACP) *viz.* cost A1, A2, B1, B2,C1, C2& C3. The details are furnished in Table 2. Among the various costs, cost C3 was selected for the study, since it is the final cost which includes all costs along with managerial input of the farmer.

TABLE 1: Selected Banana growing districts in each Agro -Climatic Zone of Tamil Nadu

S.No	Agro climatic zone	Districts
1	Western Zone	Erode
2	Cauvery Delta Zone	Trichy
3	Southern Zone	Tutucurin
4	High rainfall zone	Kanyakumari

TABLE 2: Different cost concepts

Cost A1	:	All actual expenses in cash and kind in production by the owner farmer
	i	Value of hired human labour
	ii	Value of hired bullock labour
	iii	Value of owned bullock labour
	iv	Value of machinery labour
	v	Hired machinery labour
	vi	Value of seed (a) farm produced & (b) purchased
	vii	Value of insecticides and pesticides
	viii	Value of manure (owned and purchased)
	ix	Value of fertilizers
	x	Depreciation of implements and machinery
	xi	Irrigation charges
	xii	Land revenue, cesses and other taxes
	xiii	Interest on working capital
	xiv	Miscellaneous expenses
Cost A2	:	Cost A1 + rent paid for leased-in land.
Cost B1	:	Cost A1 + interest on value of owned fixed capital assets (excluding land).
Cost B2	:	Cost B1 + rental value of owned land and rent paid for leased-in land
Cost C1	:	Cost B1 + imputed value of family labour.
Cost C2	:	Cost B2 + imputed value of family labour.
Cost C3	:	Cost C2 + 10 per cent of Cost C2 to account for managerial input of the farmer

RESULTS & DISCUSSION

The input use pattern of Banana farms in various agro - climatic zones of Tamil Nadu is furnished in Table 3. It could be observed from the Table 3 that, the maximum human labour usage in banana cultivation was in Cauvery delta zone (121 man days/ha). The maximum machine labour usage at the zone level was in Western zone (13.04 hrs/ha). Suckers adopted by sample farmers for Banana cultivation was maximum in Western zone (2761 numbers/ha). Banana is a heavy feeder crop. It was found that the fertilizer application level varied heavily among the agro- climatic zones. Among the fertilizers, maximum usage of urea was noticed in High rainfall zone (850 kg/ha), whereas potash usage was more in Cauvery delta zone (965 kg/ha). Manure application was higher in Western zone with 5.12 tonnes per hectare. For the control of weeds, glycel and butachlor was predominantly used by the sample farmers. For weevil, aphids and nematode control, furadon, phorate and monochrotophos were used by the farmers. For the control of fruit rot and leaf spot, fungicides like Dithane m -45, Carbendazim and copper oxy chloride were mainly used by the farmers. As recommended by TNAU, it is advisable to practice Integrated Pest Management (IPM) in banana so as to reduce the cost involved in chemical control of pests.

TABLE 3: Average resource usage of banana farmers in various agro climatic zones ofTamil Nadu (per hectare)

Particulars	Western Zone	Cauvery Delta Zone	Southern Zone	High Rainfall zone
Labour (man days)				
Human Labour	100.80	121.02	98.70	93.00
Machine labour	13.04	5.30	7.23	4.50
Suckers (No's)	2716.00	2250.00	2500.00	1583.33
Manures (Tonnes)	5.12	3.50	2.00	2.80
Fertilisers (Kg)				
DAP	47.00	597.00	437.5	162.50
Urea	646.00	727.94	500.00	850.00
MOP	413.80	965.00	531.25	900.00
Others	131.40			266.67

The Table 4 indicates that the total value of inputs used by farmers in Cauvery delta zone was higher (Rs 110557 /ha) than that of other zones, whereas the input usage was comparatively lower in western zone (Rs.77523/ha). Among all the inputs, usage of human labour alone constitutes around 30.83 % in Western zone to 47.02 % in Southern zone. The human labour was predominantly used in weeding, manuring and irrigation operations for banana cultivation. Next to human labour, fertilizers and manure occupy the greatest share with 25.74 % in Southern zone to 38.44 % in Western zone. It is observed that the nutrient applied in each agro-climatic zone were much higher than the recommended level prescribed by TNAU for banana cultivation. As per TNAU recommendation for garden land, NPK should be applied at the rate of 110: 35: 300 kg/hectare for varieties other than Nendran and for Nendran, 150:90:300 kg/hectare. For wetland cultivation, NPK recommendation is 210:50:390, 160:50:390 and 210:35:450 respectively for Rasthali, Poovan and Robusta, and Nendran. Plant protection chemicals share the least cost with 1 per cent to 6.39 % in High rainfall and Southern zone respectively.

TABLE 4: Cost and Returns of banana farmers in various agro -climatic zones of Tamil Nadu (Rs/hectare)

Particulars	Western Zone	Cauvery Delta Zone	Southern Zone	High Rainfall zone
Human Labour	23900.00 (30.83)	48049.30 (43.46)	42315.00 (47.02)	40208.33 (43.26)
Machine Labour	9999.01 (12.90)	6691.17 (6.05)	10760.00 (11.96)	1333.33 (1.43)
Suckers	10024.00 (12.93)	11250.00 (10.18)	8000.00 (8.89)	17083.33 (18.38)
Fertilisers and manure	29799.00 (38.44)	40838.24 (36.94)	23166.19 (25.74)	33401.66 (35.93)
Plant protection chemicals	3801.68 (4.90)	3728.84 (3.37)	5750.00 (6.39)	926.66 (1.00)
Total value of inputs	77523.69	110557.55	89991.19	92953.31

Note: figures in parenthesis indicate percentage to the total

TABLE 5: Cost and returns in banana cultivation in various agro -climatic zones of Tamil Nadu (Rs/ha)

Particulars	Western Zone	Cauvery Delta Zone	Southern Zone	High Rainfall Zone
Cost C3	123397.46	164860.90	117355.20	119630.66
Yield (kg)	22988.00	46800.00	21240.00	24516.00
Gross Returns	353956.20	376000.00	153400.00	347300.00
Net returns over cost C3	230558.84	211139.10	17725.44	227669.40

TABLE 6: Cost of production and returns from each unit of banana produced Rs/Kg

Particulars	Western Zone	Cauvery Delta Zone	Southern Zone	High Rainfall Zone
Cost of Production	5.37	3.52	5.53	4.88
Gross returns	15.40	8.03	7.22	14.17
Net Returns	10.03	4.51	1.70	9.29

The cost and returns in banana cultivation (Table 5) indicates that cost C3 which is the final cost in cost concepts (which includes all the working capital, rental value of owned and leased land, imputed value of family labour and managerial cost for the work done by farmers) ranges from Rs. 164860 /ha in Cauvery delta zone to Rs.117355/ha in Southern zone. With the exception of Southern zone, the gross returns from all the zones have crossed above Rs. 3 lakhs. Hence the net returns were higher in all the zones except the Southern zone.

It is evident from the Table 6 that, for the production of 1 kg of banana bunches; it costs around Rs. 5.53 in Southern zone, Rs. 5.37 in Western zone, Rs. 4.88 in High rainfall zone and Rs. 3.52 in Cauvery Delta zone. Thus the cost of production per kg of banana bunch is higher in Southern zone and lower in Cauvery Delta zone. The gross returns from banana bunches per kg was lower in Southern zone and higher in Western zone. The net return earned from a kg of banana is maximum in Western zone with Rs.10.03 per kg and very lower in Southern zone with Rs 1.70 per kg. The profit realized in Western zone and High rainfall zone are comparatively better than Southern zone and Cauvery delta zone. The reasons behind the reduced returns in Southern zone and Cauvery zone were the reduced yield and very low farm gate price fetched by banana bunches. Remuneration in banana cultivation differs highly with the zone. However, the banana cultivation is remunerative in all the agro-climatic zones of Tamil Nadu.

CONCLUSION

In the state, several problems were associated with the production and marketing of banana. Besides natural calamities like heavy rainfall and wind, high production cost due to steep rise in fertilizer and labour cost and scarcity of labour were the serious problems encountered by banana producers. It is observed through the study that the net return earned from a kg of banana is very low in Southern zone, mainly due to the increased cost of cultivation and less price realized by farmers. It is recommended through the study that by following the proper nutrient management, farmers can reduce the cost of cultivation. Besides, price regulation by the Government can increase the net returns of farmers.

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